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Docket No. 503.34465VV4

Serial No. 09/897,613

July 10, 2006**REMARKS**

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended each of claims 13, 14, 20 and 24 to recite a negative electrode, with active material of this negative electrode being graphite. Applicants have further amended each of claims 13, 14 and 20 to delete recitation that the graphite powder has a deintercalating capacity for lithium of at least 320 mAh/g, and to recite instead that raw material of the graphite of the negative electrode is natural graphite. Applicants have amended claim 24 to recite that the amount of Si in the graphite powder is equal to or less than 10 ppm. Note, e.g., the paragraph bridging pages 8 and 9 of Applicants' specification. Note also, for example, the third full paragraph on page 9 of Applicants' specification.

The rejection of claims 20, 21, 24 and 33 under the second paragraph of 35 USC 112, as being indefinite, set forth in Item 4 on page 2 of the Office Action mailed March 8, 2006, is noted. It is respectfully submitted that this rejection is moot, in light of amendments to claims 20 and 24 such that these claims recite that active material of said "negative" (rather than graphite) electrode is graphite.

Applicants respectfully traverse the rejection of their claims under the first paragraph of 35 USC 112, set forth in Item 2 on page 2 of the Office Action mailed March 8, 2006, especially insofar as this rejection is applicable to the claims as presently amended. Thus, note that the independent claims in the application, claims 13, 14, 20 and 24, have been amended to recite a negative electrode, "active material of said negative electrode being graphite". It is respectfully submitted that this recitation in connection with the negative electrode, and, in particular, in connection with active material of the negative electrode, is commensurate in scope

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

with Applicants' original disclosure, sufficient to satisfy the requirements of the first paragraph of 35 USC 112 as to enablement.

In this regard, attention is respectfully directed to, for example, Embodiment 5 on pages 23 and 24 of Applicants' specification. This discloses, for example, mixed negative electrode agents slurry prepared by mixing 90% by weight in total solid of the graphite powder as an active material for the negative electrode, 10% by weight of polyvinylidene fluoride as a binder and N-methyl-2-pyrrolidone; and applying the slurry onto both planes of a sheet of copper foil of 10 $\mu$ m thickness, with drying in a vacuum at 120°C for 1 hour; and, after the vacuum drying, an electrode of 175 $\mu$ m thickness was fabricated by roller pressing, the negative electrode being prepared by cutting the copper foil with the applied mixed agents into a sheet 40mm in width into a 90mm in length.

As can be seen in the foregoing, it is respectfully submitted that the negative electrode includes other material (e.g., a binder), in addition to the graphite as active material.

The contention by the Examiner that Applicants do not provide support in their specification for other materials, "but only recites graphite as the negative electrode", is respectfully traversed. Initially, it is respectfully submitted that the Examiner has erroneously interpreted the present claims, which recite that graphite is active material of the negative electrode, not that graphite is the negative electrode. It is respectfully submitted that Applicants' disclosure as a whole describes graphite as the active material of the negative electrode, consistent with the present claims. Moreover, as is clear from Applicants' original disclosure, the negative electrode is constituted by, in addition to such active material, a binder and, e.g., a conductive

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

member. Note, e.g., pages 23 and 24 of Applicants' specification. Clearly, the negative electrode of the present invention includes more than the graphite.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the prior art applied by the Examiner in rejecting claims in the Office Action mailed March 8, 2006, that is, the teachings of the U.S. patents to Takami, et al., No. 5,340,670, and to Flandrois, et al., No. 5,554,462, under the provisions of 35 USC 102 and 35 USC 103.

Initially, the undersigned notes the claims being rejected over the teachings of Flandrois, et al. Such claims being rejected include a number of claims which have previously been cancelled. It is respectfully requested that the Examiner review and clarify the claims being rejected over the teachings of Flandrois, et al., if this rejection is maintained.

In addition, the undersigned notes the contention by the Examiner in the first paragraph on page 8 of the Office Action mailed March 8, 2006. This states that the Examiner has applied Flandrois, et al. "in combination with Takami", et al., and concludes therefrom that "the arguments directed solely to Flandrois [, et al.] are deemed moot". However, note that in Item 8 on page 6 of the Office Action mailed March 8, 2006, the Examiner has applied Flandrois, et al. by itself. Upon a review of the Office Action mailed March 8, 2006, in its entirety, there is no rejection applying the combination of teachings of Takami, et al. and of Flandrois, et al. It is respectfully submitted that in view of the rejections of record in the Office Action mailed March 8, 2006, the Examiner must consider the arguments directed solely to Flandrois, et al.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

The additional contention by the Examiner in the second paragraph on page 8 of the Office Action mailed March 8, 2006, that Applicants "did not argue the particle size argument made by the examiner in the last office action", is noted. This argument is addressed in the following, and as will be clearly set forth in the following, it is respectfully submitted that Flandrois, et al. would have neither taught nor would have suggested the presently claimed subject matter, including wherein the graphite active material has a particle size as in the present claims.

It is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such a non-aqueous secondary battery as in the present claims, including, inter alia, wherein active material of the negative electrode is graphite, and this graphite active material of the negative electrode includes graphite powder having substantially completely a crystal structure, the graphite powder having a particle size equal to or smaller than 100  $\mu\text{m}$ , and (a) wherein raw material of the graphite of the negative electrode is natural graphite, as in claims 13, 14 and 20, or (b) wherein the amount of Si in the graphite powder is equal to or less than 10 ppm, as in claim 24; with a rhombohedral fraction, of the crystal structure of the graphite powder, being in a range of 0-20% by weight (see claim 13; note also claim 20), or wherein a hexagonal fraction, of the crystal structure of the graphite powder, is in a range of at least 80% by weight (see claim 14), or wherein a fraction of the rhombohedral crystal structure is equal to or less than 20% by weight and a fraction of the hexagonal crystal structure is equal to or more than 80% by weight (see claim 24; note also claim 21, reciting that a fraction of hexagonal crystal structure, of the crystal structure of the graphite powder having the specified rhombohedral structure, is equal to or more than 80% by weight, and

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

claims 32 and 33, reciting that the crystal structure of the graphite powder includes at least a fraction having hexagonal crystal structure).

The invention as claimed in the above-identified application is directed to a non-aqueous secondary battery using a negative electrode that has graphite as the active material, this graphite active material being made of graphite powder. The present invention has use, for example, in connection with a lithium battery, and provides such battery which can have a high energy density and a long life, and which has excellent intercalation capacity (that is, an increased capacity of the battery).

Carbon material has been proposed as negative electrode active material in place of lithium metal, in lithium batteries, in which charge and discharge reactions involving lithium ion intercalation into the carbon material and deintercalation from the carbon material occur. However, in previously proposed batteries (e.g., lithium secondary batteries) using carbon material as active material for the negative electrode, a large capacity cannot be obtained; and, moreover, preferable performances of rapid charging and discharging are not obtained. Note the paragraph bridging pages 2 and 3 of Applicants' specification.

Against this background, Applicants provide a non-aqueous secondary battery using a negative electrode with graphite active material, which active material has good charging and discharging characteristics, while having a large capacity (large intercalation capacity). Applicants have found that by using, as the negative electrode active material, graphite powder having substantially completely a crystal structure, with this crystal structure being at least 80% hexagonal crystal structure and/or at most 20% rhombohedral crystal structure, for the overall structure of the graphite powder (which graphite powder, e.g., has laminated graphite layers); and, in

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

particular, by limiting the amount of rhombohedral crystal structure of the graphite powder and increasing the amount of hexagonal crystal structure thereof, various advantages are achieved. In particular, by reducing the amount of rhombohedral crystal structure, of the graphite powder, and increasing hexagonal crystal structure, intercalation capacity of the negative electrode is increased. That is, the number of storage sites for lithium in the negative electrode is increased.

As another aspect of the present invention, Applicants have found that too large an amount of silicon impurity in the graphite powder has a disadvantageous effect when the graphite material is utilized as active material of a negative electrode; and have found that, especially when raw graphite is utilized in forming the graphite active material of a negative electrode, such natural graphite includes disadvantageously large amounts of silicon impurity. Applicants have found that the disadvantageous effects of the silicon impurity can be avoided where amount of silicon in the graphite powder is equal to or less than 10 ppm. See, for example, the paragraph bridging pages 8 and 9 of Applicants' specification.

Aspects of the present invention focus on the crystal structure of the graphite powder of the active material of the negative electrode, requiring that the graphite powder active material has substantially completely a crystal structure, and the crystal structure is constituted of hexagonal crystal structure of at least 80% by weight and rhombohedral crystal structure in a range of 0-20% by weight. The graphite powder of the active material of the negative electrode, according to the present invention, has increased hexagonal crystal structure, due to an orderliness and regularity of the hexagonal-net-plane layers, and the regular stacking of these layers. That is, it is respectfully submitted that the fundamental hexagonal crystal structure, of the substantially complete crystal structure of the graphite powder

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

according to the present invention, is achieved based upon regularity and orderliness of the lamination (stacking) of these layers. In accordance with the present invention, the existing ratio of hexagonal crystal structure, of the substantially complete crystal structure of the graphite powder as a whole, is specified at a high level, and/or the rhombohedral crystal structure is at a low level, in order to achieve the increased capacity of the battery as described in Applicants' disclosure.

In comparison, and as will be discussed in more detail infra, Takami, et al. discloses crystallites, and structure with hexagonal-net-plane layers; however, this reference is silent with respect to orderliness and regularity of the laminated (stacked) hexagonal-net-plane layers. More specifically, it is respectfully submitted that Takami, et al. teaches away from such orderliness and regularity (e.g., a substantially complete crystal structure) of the laminated hexagonal-net-plane layers, in describing that the hexagonal-net-plane layers stacked in the graphite structure "have appropriate displacements, twists and angles to one another", so that when the stacked hexagonal-net-layers have appropriate displacements, twists, and angles to one another, lithium ions diffuse more easily between the hexagonal-net-plane layers, so the carbonaceous material presents a property of reversibly, rapidly absorbing and desorbing a large number of lithium ions. See column 7, lines 29-40.

It is respectfully submitted that the carbonaceous material in Takami, et al. is constituted by stacking "hexagonal-net-plane layers", each of the layers is constituted by a unit plane layer A, B or C, and each unit plane layer is constituted by a large number of crystallites spread in a plane, each of which is constituted by 6 carbon atoms, as, for example, illustrated in Figs. 1 and 3 of Flandrois, et al. Importantly, it is respectfully submitted that Takami, et al. nowhere discloses the stacking condition of the hexagonal-net-plane layers, other than describing that the

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

layers stacked in the graphite structure "have appropriate displacements, twists and angles to one another". As stated previously, and discussed further infra, such appropriate displacements, twists and angles to one another teach away from the substantially complete crystal structure of the graphite powder as in the present claims. Specifically, according to the present invention, the layers are stacked in an orderly and regular manner to form substantially complete crystal structure in the graphite.

While Takami, et al. describes crystal planes (faces) (101) and (100) for specifying the intensity ratio  $P_{101}/P_{100}$  of the (101) diffraction peak  $P_{101}$  to the (100) diffraction peak  $P_{100}$  of the graphite structure, Takami, et al. refers to crystallites of the graphite structure, and it is respectfully submitted that this reference does not identify crystal planes, or whether the planes relate to hexagonal crystal structure or rhombohedral crystal structure.

It is respectfully submitted that Takami, et al. specifically discloses the need for twisted structures, thus having a number of twisted structures. In comparison, the present invention has a substantially complete crystal structure, substantially without twisted structures as required by Takami, et al. As contended previously, and as will be discussed further infra, it is respectfully submitted that the disclosure of Takami, et al. in connection with "displacements, twists and angles" of the hexagonal-net-plane layers to one another would have taught away from the substantially complete crystal structure with the recited hexagonal/rhombohedral crystal structure, and advantages thereof with respect to increased intercalation capacity of the negative electrode, as in the present invention.

Furthermore, and as indicated previously, Takami, et al. discloses crystallites, and structure with hexagonal-net-plane layers which are laminated; however, it is



Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

respectfully submitted that this reference is silent with respect to orderliness and regularity of the laminated (stacked) hexagonal-net-plane layers; and, in particular, it is respectfully submitted that this reference is silent in connection with the substantially complete crystal structure. In connection with differences between crystallites and crystals, attention is again respectfully directed to the definition of "crystal" and of "crystallite" on page 327 of Hawley's Condensed Chemical Dictionary (12<sup>th</sup> Ed. 1993), submitted with the Submission (Amendment) filed November 22, 2004. As can be appreciated therefrom, a crystallite is that portion of a crystal whose constituent atoms, ions or molecules form a perfect lattice, without strains or other imperfections, and is usually microscopic (while crystals may be quite large). Taking the disclosure of Takami, et al. as a whole, including the disclosure therein of "appropriate displacements, twists and angles" of the planar layers to one another (note, for example, column 7, line 21-40 of Takami, et al.), it is respectfully submitted that Takami, et al. would have neither disclosed nor would have suggested, and in fact would have taught away from, the crystal powder having a substantially complete crystal structure, and especially with specified fractions of the crystal structure being hexagonal and/or rhombohedral, as in the present claims, and advantages thereof.

In the second paragraph on page 4 of the Office Action mailed March 8, 2006, the Examiner contends that the description in Takami, et al. of carbonaceous material for the anode in a lithium secondary battery having an exothermic peak and an intensity ratio of two different diffraction peaks obtained by x-ray diffraction analysis indicates "a crystal structure for the entire anode material". Applicants respectfully traverse this contention by the Examiner. Initially, it is noted that the Examiner has provided no evidence or reasoning in support of this contention.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

Absent evidence or reasoning in support thereof, it is respectfully submitted that this contention by the Examiner is clearly improper under the requirements of 35 USC 102 and 35 USC 103. See In re McKellin, 188 USPQ 428 (CCPA 1976).

Moreover, it is respectfully submitted that this contention by the Examiner is totally inconsistent with the express teachings of Takami, et al., discussed infra, which describes the graphite structure having "appropriate displacements, twists and angles to one another". From the express teachings of Takami, et al., of crystallites wherein the stacked hexagonal-net-plane layers have appropriate displacements, twists and angles to one another, such clearly rebuts the contention by the Examiner as to a crystal structure for the graphite material in Takami, et al.

To emphasize, in accordance with the present invention, graphite powder of a relatively small size is used as the active material for the negative electrode, and a focus thereof is on a substantially complete crystallinity of this graphite powder and the type of crystal structure. Applicants have found that by using graphite powder having a substantially complete crystal structure, and having a relatively large amount of this crystal structure being hexagonal crystal structure; and, in particular, with this crystal structure of the graphite powder having a specific ratio of hexagonal crystal structure to rhombohedral crystal structure, improvements in capacity are achieved. That is, according to the present invention the graphite powder which is the active material of the negative electrode has a substantially complete graphite crystal structure, and Applicants limit the amount of rhombohedral structure and increase amount of hexagonal crystal structure, with orderliness and regularity between the laminate layers of the graphite (e.g., a substantially complete crystal structure), so as achieve unexpectedly better results of increased capacity, as seen in Applicants' disclosure.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

According to the present invention, the layers are formed by stacking the same while displacing regularly the respective layers in a predetermined manner to form substantially completely crystal structures in the graphite. It is respectfully submitted that when simply stacking the "hexagonal-net-plane layers" as in Takami, et al., it can not be determined as to whether "hexagonal" crystal structure or "rhombohedral" crystal structure is formed; and, moreover, as stated previously, in view of the displacements, twists and angles, expressly described in Takami, et al., it is respectfully submitted that this reference would not have taught or suggested, and in fact would have taught away from, crystal structure as in the present claims.

Moreover, while Takami, et al. refers to the crystal planes (faces) (101) and (100) for specifying the intensity ratio  $P_{101}/P_{100}$  of the (101) diffraction peak  $P_{101}$  to the (100) diffraction peak  $P_{100}$  of the graphite structure, Takami, et al. fails to identify whether the crystal planes referred to are of crystal structure, much less of hexagonal or rhombohedral crystal structure.

In contrast, according to the present invention the crystal plane (100) of hexagonal crystal structure and crystal planes (101) and (012) of rhombohedral crystal structure are identified, and the crystal structures of the graphite is determined through measuring diffraction peaks of the respective crystal planes by x-ray diffraction analysis. For example, the peaks observed at 42.3° and 44.4° relate to the crystal planes (100) and (101) of hexagonal crystal structure, which clearly shows the existence of the hexagonal crystal structure; and the peaks of observed at 43.3° and 46.0° relate to the crystal planes (101) and (102) of rhombohedral crystal structure, which clearly shows the existence of the rhombohedral crystal structure.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

Since Takami, et al. fails to disclose the stacking condition of the "hexagonal-net-plane layers", it is respectfully submitted that Takami, et al. fails to disclose the graphite as defined by the present invention.

Furthermore, it is again noted that using natural graphite as the raw material of the graphite active material of the negative electrode introduces various impurities, in particular, silicon. It is respectfully submitted that natural graphite contains a relatively great amount of silicon as an impurity. Any disadvantageous effects of the silicon are avoided, according to aspects of the present invention, by reducing amount of silicon in the graphite powder to an amount equal to or less than 10 ppm. As will be seen from a review of the teachings of either of Takami, et al. or Flandrois, et al., neither of these references would have disclosed nor would have suggested disadvantageous effects of silicon as an impurity, and avoiding such disadvantageous effects by including an amount of silicon in the graphite powder of the graphite active material which is equal to or less than 10 ppm.

In the last paragraph on page 5 of the Office Action mailed March 8, 2006, the Examiner acknowledges that Takami, et al. has displacements, twists and angles "to some degree", but contends that Applicants have not included claim language distinguishing therefrom. This contention by the Examiner is respectfully traversed. Rather than having displacements, twists and angles "to some degree", as alleged by the Examiner, it is respectfully submitted that these displacements, twists and angles are necessary requirements of Takami, et al., to achieve diffusion of lithium ions with ease according to the description therein. Moreover, it is respectfully submitted that Applicants provide language distinguishing from Takami, et al., for example, in reciting that the graphite powder has substantially completely a crystal structure, as in the present claims and as described in Applicants' specification.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

Takami, et al discloses a negative electrode carbonaceous material suitable for a lithium secondary battery, as well as a battery using this negative electrode carbonaceous material. According to Takami, et al., the negative electrode contains a carbonaceous material which has an exothermic peak at 700° C or more when measured by a differential thermal analysis, and an intensity ratio  $P_{101}/P_{100}$  of a (101) diffraction peak  $P_{101}$  to a (100) diffraction peak  $P_{100}$  of a graphite structure obtained by X-ray diffraction analysis, of 0.7-2.2; and absorbs and desorbs lithium ions. See column 3, lines 1-8. Other negative electrodes disclosed in Takami, et al., are described at column 3, lines 16-25, 38-44, 56-60 and 66-68; as well in column 4, lines 9-13, 17 and 18.

Note also column 20, lines 25-56; column 21, lines 3-22; column 22, lines 1-19 and 37-62; and column 23, lines 10-21, for other disclosures in connection with negative electrodes of the secondary battery of Takami, et al. These disclosures all refer to the carbonaceous material having a graphite structure that exhibits a property of allowing reversible absorption and desorption of lithium ions to and from hexagonal-net-plane layers in the graphite structure. Note also, for example, example 1 in column 24 and particularly lines 23-29 thereof, disclosing that the carbonaceous material used was a graphitized carbon powder with an average particle size of 25  $\mu\text{m}$ , which was distributed at a ratio of 90 vol.% within the range of 1-50  $\mu\text{m}$  in a particle size distribution, and in which the ratio of particles with a particle size of 0.5  $\mu\text{m}$  or less was 0 vol. % in the particle size distribution. Note also, inter alia, example 2 and the discussion in connection therewith at column 25, lines 20-26; and example 3 and the discussion in connection therewith at column 25, lines 52-59, describing particle size of the carbonaceous material.

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

Attention is particularly directed to column 7, lines 29-40, of Takami, et al., emphasizing that the carbonaceous material having the recited intensity ratio has appropriate displacements, twists and angles of the hexagonal-net-plane layers so that lithium ions diffuse more easily between the hexagonal-net-plane layers; and note also column 14, lines 21-39, disclosing that the carbonaceous material has a mean length La of a crystallite in the a-axis direction of graphite structure. This patent again refers to crystallite structure, e.g., at column 22, lines 37-62.

It is respectfully submitted that the disclosure in Takami, et al., having, e.g., crystallites, and having hexagonal-net-plane layers with appropriate displacements, twists and angles, would have neither disclosed nor would have suggested the presently claimed structure, including the graphite powder having substantially completely the crystal structure, with the recited particle size of the graphite powder and with specified hexagonal and/or rhombohedral fraction of the crystal structure of the graphite powder, and the graphite powder having a deintercalating capacity for lithium of at least 320 mAh/g, and advantages thereof, as described in the foregoing.

The contentions by the Examiner in the first full paragraph on page 6 of the Office Action mailed March 8, 2006, are noted. Initially, as is clear from the foregoing, Applicants respectfully submit that the carbon material of Takami, et al. is different from the active material of the negative electrode in the present claims, and for this reason alone any inherency argument by the Examiner falls.

In addition, the assertion by the Examiner that all carbon crystal material includes at least 3% rhombohedral crystal structure is noted. It is emphasized that according to the present invention the amount of rhombohedral crystal structure is limited (that is, reduced); it is respectfully submitted that where carbon crystal material contains relatively large amounts of rhombohedral crystal structure,

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

negative electrode active material formed therefrom would not achieve advantages of the present invention.

Moreover, as Takami, et al. does not disclose crystal structure, reference by the Examiner that all carbon crystal material includes at least 3% rhombohedral crystal structure would not have provided any information leading to the present invention, where rhombohedral crystal structure is limited.

The contention by the Examiner in the third full paragraph on page 5 of the Office Action mailed March 8, 2006, that Applicants have not claimed the crystal structure as being "entire", is noted. The Examiner's attention is respectfully directed to each of claims 13, 14, 20 and 24, reciting that the graphite powder has "substantially completely a crystal structure".

The contention by the Examiner in the second full paragraph on page 5 of the Office Action mailed March 8, 2006, that Takami, et al. discloses crystal structure that includes orderliness and regularity of the layers, the Examiner referring to the x-ray diffraction peaks described in Takami, et al., is noted. Again, this is totally inconsistent with the express teachings of Takami, et al., which describe that the hexagonal-net-plane layers have appropriate displacements, twists and angles to one another. Taking the teachings of Takami, et al. as a whole, as required under 35 USC 102 and 35 USC 103, it is respectfully submitted that this reference would have taught away from the substantially complete crystal structure of the graphite active material, as in all of the present claims.

Flandrois, et al. discloses a carbon anode for a lithium rechargeable electrochemical cell, and a process for its production. The carbon anode comprises a graphite-containing, carbon-containing material, characterized in that the material includes, prior to electrical cycling, at least a first phase constituted by graphite

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

having a rhombohedral crystal structure and comprising a fraction of more than 10%. See column 2, lines 3-10. Note also column 2, lines 33-40. See also the examples and Tables in connection therewith, showing, inter alia, passivation capacity (mAh/g).

Initially, it is noted that Flandrois, et al. discloses a carbon anode which includes a graphite-containing, carbon-containing material. Such disclosure of an anode would have neither disclosed nor would have suggested the presently claimed subject matter, including the negative electrode having an active material thereof being graphite, the graphite active material of the negative electrode including the specified graphite powder. Clearly, the carbon anode is the positive electrode in Flandrois, et al. Moreover, it is respectfully submitted that Flandrois, et al. is concerned with providing a carbon-containing anode having increased rhombohedral structure, so as to increase passivation capacity. In contrast, the graphite powder of the negative electrode of the present invention has increased hexagonal crystal structure and decreased rhombohedral crystal structure so as to increase deintercalating capacity for lithium. It is respectfully submitted that Flandrois, et al. would have neither taught nor would have suggested the presently claimed invention, including, inter alia, the negative electrode with graphite as active material, ranges of hexagonal and rhombohedral fractions, and unexpectedly better results achieved in these ranges, as in the present invention; as well as other features of the present invention as discussed previously.

It is respectfully submitted that Flandrois, et al. is characterized by containing more rhombohedral crystal structure of the graphite; in contrast, the present invention is characterized by limiting the content of the rhombohedral crystal structure of the graphite, so as to achieve the advantages discussed previously.



Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

Moreover, various claims of the present application recite that the raw material of the graphite is natural graphite. It is respectfully submitted that Flandrois, et al., or Takami, et al., would have neither disclosed nor would have suggested the presently claimed invention, including wherein the raw material of the graphite is natural graphite.

In addition, it is respectfully submitted that Flandrois, et al. would have neither taught nor would have suggested a particle size of the graphite powder being equal to or smaller than 100µm, as in the present claims.

In this regard, the contention by the Examiner that since the graphite in Flandrois, et al. is ground in an impeller beaker for a minimum period of 15 minutes (see column 8, lines 1-6 of Flandrois, et al.), the size of the graphite would have been 100 microns or less, is respectfully traversed. It is noted that the graphite in Flandrois, et al. is simply ground in an impeller beaker. It is respectfully submitted that the size of the powder formed thereby would be uneven, containing, inter alia, powder having a grain diameter more than 100 microns as well as smaller particles. In contrast, according to the present invention, the graphite powder is uniformly 100 microns or less. Such graphite powder size is achieved, for example, through use of a sieve. It is respectfully submitted that Flandrois, et al. would have neither taught nor would have suggested the presently claimed subject matter, including particle size of the powder as in the present claims, and advantages thereof.

The contention by the Examiner in the first full paragraph on page 7 of the Office Action mailed March 8, 2006, that it is notoriously well known in the battery art to have electrode particles be of a particle size as in the present claims, is noted. The Examiner has pointed to no evidence or reasoning in support thereof; and, in particular, has pointed to no evidence or reasoning suggesting the material of

Docket No. 503.34465VV4  
Serial No. 09/897,613  
July 10, 2006

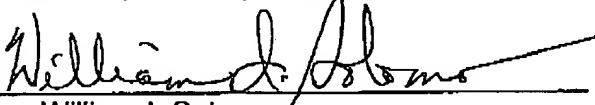
Flandrois, et al. should be of a size as in the present claims. Especially in view of advantages achieved by the present invention, including size of the graphite powder, as discussed previously, the mere conclusion by the Examiner, without any evidence or reasoning in support thereof, is improper.

In view of the foregoing comments and amendments, entry of the present amendments, and reconsideration and allowance of all claims presently pending in the above-identified application, are respectfully requested.

Please charge any shortage in the fees due in connection with the filing of this paper to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case No. 503.34465VV4), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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